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6.4 Electronic Controls for Plumbing Fixtures

Automated controls for faucets, toilets, and urinals help address occupants' concerns about disease transmission via contact with bathroom surfaces and fixtures—they can also reduce water consumption. These controls are rapidly gaining popularity in all types of commercial and institutional facilities, though the driver is generally hygiene rather than water or energy savings.

Opportunities

Electronic controls can be installed with new plumbing fixtures or retrofitted onto many types of existing fixtures. Potential water savings are greater with retrofits because current fixtures generally do not meet water-conservation standards unless they are upgraded as part of the retrofit. Though water savings depend greatly on the type of facility and the particular controls used, some facilities report a 70% savings. This type of on-demand system can also produce proportional savings in water heating (for faucets) and sewage treatment.

Technical Information

Electronic controls for plumbing fixtures usually function by transmitting a continuous beam of infrared (IR) light. With faucet controls, when a user interrupts this IR beam, a solenoid is activated, turning on the water flow. Dual-beam IR sensors or multispectrum sensors are generally recommended because they perform better for users with dark skin. With toilets and urinals, the flush is actuated when the user moves away and the IR beam is no longer blocked. The cost of automated-control fixtures is quite high.

Some brands of no-hands faucets are equipped with timers to defeat attempts to alter their operation or to provide a maximum on-cycle—usually 30 seconds.

Depending on the faucet, a 10-second handwash typical of an electronic unit will consume as little as 1-1/3 cups (0.3 liters) of water. A 10-second cycle is required as a minimum by the Americans with Disabilities Act. Choose the lowest-flow faucet valves available—typically 0.5 gpm (1.9 liters per minute).

Electronic controls can also be used for other purposes in restrooms. Sensor-operated hand dryers are very hygienic and save energy (compared with conventional electric hand dryers) by automatically shutting off when the user steps away. Soap dispensers can be electronically controlled. Electronic door openers can be employed to further reduce contact with bathroom surfaces. Even showers are now sometimes being controlled with electronic sensors—for example, in prisons and military barracks.

Electronic fixtures are particularly useful for handicapped installations and hospitals, greatly reducing the need to manipulate awkward fixture handles and removing the possibility of scalding caused by improper water control.

No-touch faucets are available with (1) the sensor mounted in the wall behind the sink, (2) the sensor integrated into the faucet, and (3) the sensor mounted in an existing hot- or cold-water handle hole and the faucet body in the center hole. For new installations, the first or second option is usually best; for retrofit installations, the last option may be the only one feasible.

At sports facilities where urinals experience heavy use, the entire restroom can be set up and treated as if it were a single fixture. Traffic can be detected and the urinals flushed periodically based on traffic rather than per person. This can significantly reduce water use.

Computer controls can be used to coordinate water usage to divert water for fire protection when necessary.

Thermostatic valves can be used with electronic faucets to deliver water at a preset temperature. Reducing hot water saves a significant amount of energy.

A 24-volt transformer operating off a 120-volt AC power supply is typically used, at least with new installations. The transformer should be UL-listed, and for security reasons the transformer and the solenoid valve should be remotely located in a chase.

Many commercial faucets can be retrofitted very quickly, requiring just 7 to 9 minutes per fixture, according to Sloan Valve, a supplier of electronic plumbing fixture controls.

Electronic faucet controls offer the convenience and sanitary benefits of hands-free operation. If the system is properly set up, significant water and energy savings are achieved.

Photo: Sloan Valve

Battery-powered controls are often used for retrofit applications because connecting AC electricity to each fixture can be costly. For battery-controlled units, most manufacturers recommend standard alkaline batteries, which last two to three years with typical usage; lithium batteries require less frequent replacement (they can last up to five years), but they are more expensive. In heavy usage areas, such as airports, battery-powered controls are not recommended because of the need for frequent replacement.

For battery-powered controls, provide a plan for proper disposal of used batteries.

For hospitals or other medical facilities, electronic fixtures should be used to the maximum extent possible because they can help health care professionals meet the Occupational Safety and Health Administration (OSHA) protocols for handwashing after patient contact.

Automated faucets are much easier to clean since there are no handles in the way. The industrial-grade solenoid valves used in these devices are far more durable than their mechanical counterparts and are virtually unaffected by chemicals and other constituents of the water supply.

Some manufacturers estimate a payback period of less than 6 months when a conventional fixture is replaced with an electronic one. With faucets, this includes savings in water, energy, and maintenance. With toilets and urinals, some of the water savings may be attributable to reduced incidence of intentional multiple-flushing—a common practice with toilets and urinals.

Careful calibration is required with some electronic controls to prevent (or lessen the likelihood of) *unintentional* multiple flushes—which can happen, for example, in airport toilet stalls when they are used for changing clothes.

References

Marsch, Donald R., "Getting a Hand on No-Hands Fixtures," *The Construction Specifier,* August 1990, pp. 61–66.

American Water Works Association, 6666 W. Quincy Avenue, Denver, CO 80235; (800) 559-9855, (303) 794-6303 (fax); WaterWiser Web site: www.waterwiser.org.